

Myocardial infarction with a combined ST-segment elevation in anterior and inferior leads: the left anterior descending artery does not have to be a “wrap-around” vessel to be a culprit

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A 50-year-old woman, with no known cardiovascular risk factors, was admitted due to retrosternal chest pain radiating to both shoulders. Her electrocardiogram (ECG) demonstrated a combined ST-segment elevation in anterior (V_2 through V_6) and inferior (II, III, and aVF) leads (FIGURE 1A). The patient was transferred to a catheterization laboratory and underwent coronary angiography, which revealed an occlusion in the mid segment of the left anterior descending (LAD) artery distal to the first diagonal branch (FIGURE 1B). The artery had slow filling to the point of the occlusion, with a meniscus suggestive of an infarct-related artery (IRA). The left circumflex artery and the right coronary artery (RCA) were normal (FIGURE 1C). The IRA was treated by implanting 2 zotarolimus-eluting stents with a good angiographic result (FIGURE 1D). Importantly, despite anterior and inferior ST-segment elevations at presentation, the LAD artery was not a “wrap-around” vessel.

The electrocardiographic identification of the IRA is often challenging in the setting of ST-segment elevation myocardial infarction.¹ Acute myocardial infarction with a combined ST-segment elevation in anterior and inferior leads is a relatively rare clinical entity, commonly attributed to an occlusion of the LAD artery that wraps around the apex and supplies both the anterior and inferior walls.² However, several reports, including the presented case,

challenge this notion and indicate other angiographic characteristics in patients with anterior and inferior ST-segment elevations.^{3,4} The most frequent one (90% of cases) is a single-vessel occlusion of either the RCA or the LAD artery.³ Of note, as presented in this case, the LAD artery does not have to be the so-called “wrap-around” vessel. Furthermore, distinguishing between the RCA and LAD artery occlusion can be based on ECG criteria. An ST-segment elevation in lead V_2 greater than or equal to that observed in lead V_3 and greater than or equal to 2.5 mm in lead III suggests the RCA against the LAD artery as an IRA with high accuracy.³ In the presented case, the ST-segment elevation in lead V_3 greater than that in leads V_2 and III was 1 mm to 1.5 mm, which is an ECG pattern indicating LAD artery involvement. Another algorithm for the differentiation of the infarct territory in difficult-to-discern ECGs was proposed by Bozbeyoğlu et al.⁵ In patients with the maximal ST-segment elevation in chest leads greater than the maximal ST-segment elevation in limb leads with a T wave amplitude greater than an R wave amplitude in lead V_3 , the LAD artery is an IRA in more than 80% of cases. This is in concordance with the presented case, in which the ST-segment elevation in lead V_3 was greater than in any of the precordial leads and the T wave amplitude in lead V_3 was greater than the amplitude of the residual T wave. Last but not least,

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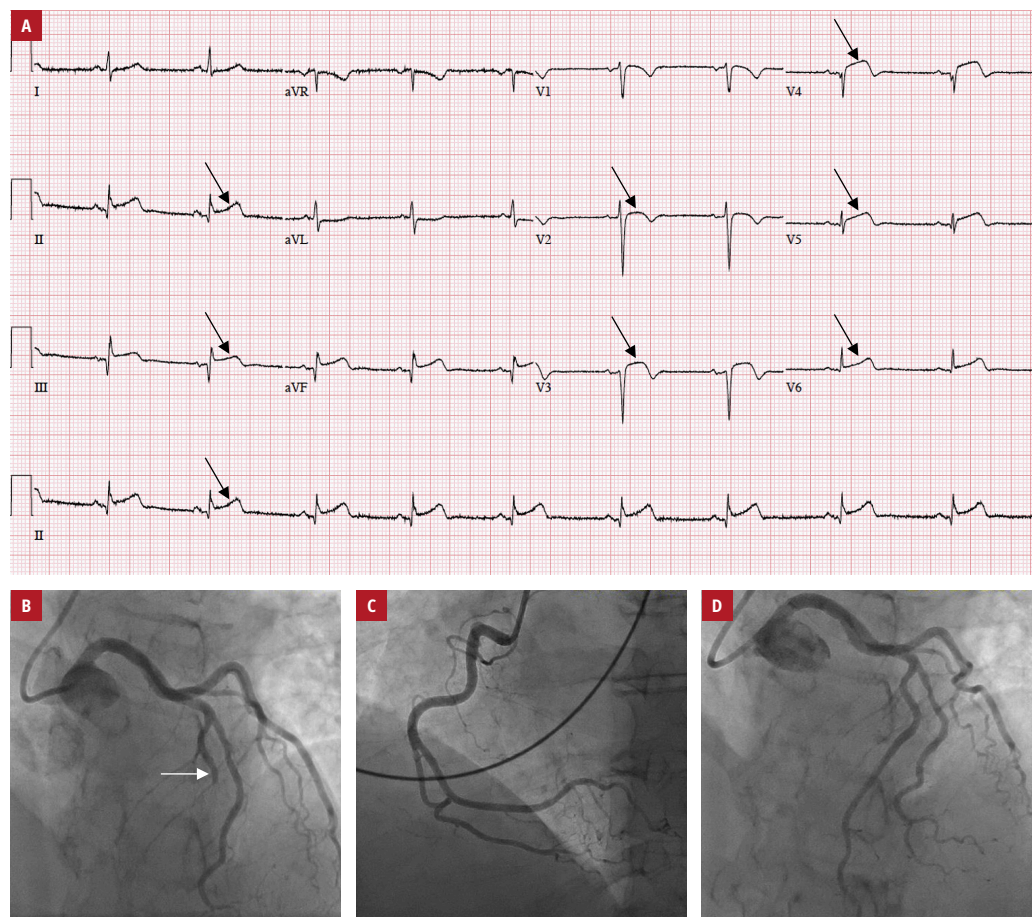


FIGURE 1 **A** – an electrocardiogram demonstrating a combined ST-segment elevation in anterior and inferior leads (arrows); **B** – left coronary artery angiography demonstrating LAD artery occlusion (arrow); **C** – right coronary artery angiography; **D** – left coronary artery angiography following the procedure

a combined anterior and inferior ST-segment elevation might be the result of 2-vessel occlusion, when the IRA supplies a myocardial region with a chronically occluded vessel. Probably, the real prevalence of this particular clinical scenario is underestimated owing to a high fatality rate.³

This case highlights that acute myocardial infarction with a combined ST-segment elevation in anterior and inferior leads might not be necessarily related to an occlusion of the so-called “wrap-around” LAD artery. Furthermore, available ECG criteria might help to identify the culprit vessel by assessing the ST-segment elevation in leads V_2 through V_3 and III and/or evaluating the ST-segment elevation (in chest versus limb leads) and the amplitude of the T wave versus the R wave in lead V_3 .^{3,5}

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ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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